

### **REMARKS**

Applicants acknowledge receipt of an Office Action dated December 5, 2001. In addition, Applicants acknowledge receipt of a Decision Granting Petition to Restart Period for Reply in which the U.S. Patent and Trademark Office ("PTO") has reset the shortened statutory period set forth in the Office Action dated December 5, 2001 to run from the date of receipt of January 29, 2002.

In this response, Applicants have cancelled claims 6 and 9 and incorporated the subject matter of these claims into claim 1. Following entry of these amendments, claims 1-5, 7, 8 and 10-21 are pending in the application. Claims 17 and 21 have been withdrawn by the PTO as directed to a non-elected species. In addition, Applicants have amended the specification as referenced below and provide herewith proposed changes to the drawings.

In view of the foregoing amendments and the remarks which follow, Applicants respectfully request reconsideration of the present application.

#### **Drawings**

In the Office Action, the PTO has objected to the drawings and has required that "a cooling loop carrying engine coolant and communicating with the engine and a heat exchanger in the cooling loop" be shown in the drawings or the feature cancelled from the claims. In this response, Applicants have submitted proposed changes to the drawings, inserting Figure 15 which shows a cooling loop carrying coolant and communicating with the engine and a heat exchanger in the cooling loop. Applicants have also amended the Brief Description of the Drawings to include a brief description of Figure 15. Support for these amendments may be found in the specification at, for example, paragraph 0006.

#### **Rejections Under 35 U.S.C. §112, 2<sup>nd</sup> Paragraph**

In the Office Action, the PTO has rejected claims 6, 9-11, 13-14 and 19-20 under 35 U.S.C. §112, 2<sup>nd</sup> paragraph.

As an initial matter, Applicants note that the limitations of claim 6 and 9 have been incorporated into claim 1.

In claim 6, with regard to the reference to the variable "C," Applicants note that the rejection of claim 6 has been rendered moot by the cancellation of the claim and that claim 1, as amended, does not recite a variable, "C".

With regard to claim 9, applicants note that claim 9 has been canceled. As claim 1 has been amended to include the subject matter of claim 9, Applicants note that the "a" refers to the offset distance between vortex generator rows on the first and second flat faces. This is clearly shown in Figure 2.

With regard to claim 10, Applicants note that the angle  $\beta$  is clearly depicted in Figure 9. As shown in the Figure the angle is measured relative to a line perpendicular to the length of the tube, e.g. perpendicular to flow direction of medium through the tube.

With regard to claim 11, Applicants note that the phrase, "the flat tubes are beaded tubes, with a bead running parallel to the tube longitudinal axis," was present in claim 11 in the present application as filed. In this response, the specification has been amended to include this subject matter.

With regard to claims 13-14, Applicants submit that this rejection is moot in view of the proposed drawing corrections.

With regard to claims 19 and 20, Applicants note that the vortex generators can be arranged in individual rows whereby they are arranged behind one another in a longitudinal direction with respect to the tubes. Referring to Figure 9 or Figure 7 of the original application, the vortex generators are arranged in diagonal rows, whereby plural rows again are arranged behind one another and this in a longitudinal direction with respect to the tubes as well as in the flow direction of the medium through the tube.

**Rejections Under 35 U.S.C. §103(a)**

In the Office Action, the PTO has rejected claims 1-5, 8, 12, 14-16 and 19-20 under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent 6,070,616 to Beck *et al.* (hereafter "Beck") in view of U.S. Patent 4,470,452 to Rhodes (hereafter "Rhodes"). In addition, the PTO has rejected claims 6 and 7 under §103 as allegedly being unpatentable over Beck in view of Rhodes in further view of U.S. Patent 6,321,835 to Damsohn *et al.* (hereafter "Damsohn"). Finally, the PTO has rejected claims 10 and 18 under §103(a) as

allegedly being unpatentable over Beck in view of Rhodes in further view of JP 359125395A to Imai Shuji (hereafter "Shuji").

In order to establish a *prima facie* case of obviousness, all the claim limitations must be taught or suggested by the prior art. See MPEP §2143.03.

In this response, Applicants have amended claim 1 to include the limitations of claims 6 and 9. Beck fails to disclose or fairly suggest a heat exchanger for a motor vehicle, as claimed in amended claim 1, "*wherein the ratio of the distance between the vortex generator rows in the direction of the tube longitudinal axis to the length of the vortex generators is about 1 to 10*" and "*wherein the ratio of the distance between the first flat face and the second flat face of the vortex generator rows in the direction of the tube longitudinal axis to the height of the vortex generators is approximately 10 to 30.*" As none of Rhodes, Damsohn and/or Shuji, take either alone or in fair combination with Beck disclose or fairly suggest a heat exchanger as recited in instant claim 1, Applicants respectfully request reconsideration and withdrawal of the outstanding rejection of claim 1 under §103.

According to MPEP §2143.03, if an independent claim is nonobvious under §103, then any claim depending therefrom is non-obvious. Since claims 2-5, 7, 8, 10-12, 14-16 and 18-20 depend from or otherwise include the limitations of claim 1, Applicants submit that these claims are allowable for at least the same reasons as claim 1 and respectfully request reconsideration and withdrawal of the outstanding rejections of the these claims.

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### CONCLUSION

In view of the foregoing amendments and remarks, applicants respectfully submit that all of the pending claims are now in condition for allowance. An early notice to this effect is earnestly solicited. If there are any questions regarding the application, the Examiner is invited to contact the undersigned at the number below.

Respectfully submitted,

Date 5/29/02

FOLEY & LARDNER  
Customer Number: 22428



22428

PATENT TRADEMARK OFFICE

Telephone: (202) 672-5300

Facsimile: (202) 672-5399

By R. L. Schwaab Reg. No. 47,369

for  
Richard L. Schwaab  
Attorney for Applicant  
Registration No. 25,479

Should additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge Deposit Account No. 19-0741 for any such fees; and applicant(s) hereby petition for any needed extension of time.

**Versions with Markings to Show Changes Made**

**In the Claims:**

1. (Amended) A heat exchanger for motor vehicles comprising:
  - (a) a plurality of flat tubes through which a fluid cooling medium can flow;
  - (b) elongated vortex generators in the form of indentations pointing inward on at least one flat face of said flat tubes, and
    - (i) wherein the ratio between a height,  $h$ , of the vortex generators and a height,  $H$ , of the flat tubes is approximately 0.05 to 0.5;
    - (ii) wherein a longitudinal axes of the vortex generators are inclined at angles of approximately  $10^{\circ}$  to  $40^{\circ}$  with respect to the tube longitudinal axis; and
    - (iii) wherein vortex generators which are adjacent transversely with respect to the tube longitudinal axis are inclined in opposite directions; and
    - (iv) wherein the ratio of the distance between the vortex generator rows in the direction of the tube longitudinal axis to the length of the vortex generators is about 1 to 10; and**
    - (v) wherein the ratio of the distance between the first flat face and the second flat face of the vortex generator rows in the direction of the tube longitudinal axis to the height of the vortex generators is approximately 10 to 30**
  - (c) corrugated fins to which environmental air or other media can be applied operably linked to said flat tubes.